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## Improving oral health in nursing home residents

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Title page

# Improving oral health in nursing home residents: A process evaluation of a Shared Oral Care intervention

Short running title: Improving oral health in nursing home residents

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## Improving oral health in nursing home residents: A process evaluation of a Shared Oral Care intervention

### Abstract

**Aims and objectives:** *To evaluate the process of implementing an oral care intervention in nursing homes in a Danish municipality.*

**Background:** *Older people with aged natural dentition require preventive and curative oral health care. An intervention based on principles of situated learning was implemented to establish closer cooperation between dental and nursing staff in nursing homes, leading to improved oral hygiene in nursing home residents.*

**Design:** *An embedded multiple-case study combined with principles of realist evaluation unfolded in three phases: Formulation of initial program theory, Testing and Refining the program theory. The COREQ checklist is followed in reporting.*

**Methods:** *Observations, six group interviews and 22 face-to-face interviews with dentists, dental practitioners, nursing home managers, care professionals, and residents were conducted in three nursing homes (n = 41).*

**Results:** *Three main outcomes of a program theory were identified, relating to 1) residents, in the form of new oral care routines; 2) interdisciplinary working, in the form of professional pride in performing sufficient oral care; 3) organizational level changes, in the form of increased interdisciplinary knowledge sharing. The overarching supportive mechanisms were the creation of*



*relationships between residents, dental practitioners and care professionals as well as nursing home management taking responsibility for structure, planning and knowledge sharing.*

**Conclusion:** *The situated learning perspective supported residents and care professionals' competencies in performing sufficient oral care. The Shared Oral Care intervention supports an individual and multidisciplinary assessment of nursing home residents' ability to self-care concerning oral care. Contextual factors, supportive and restraining mechanisms influence the intervention's success.*

**Relevance to clinical practice:** *Understanding the complexity within interdisciplinary cooperation in primary nursing and unraveling the necessary properties to enhance nursing home residents' oral health care are areas of improvement for care service in nursing homes.*

Keywords:

Evaluation study; Interdisciplinary Research; Nursing homes; Oral health; Qualitative Research.

What does this paper contribute to the wider global clinical community?

- To create positive change in oral care in nursing home residents there is a need for more knowledge on barriers and supportive mechanisms. This study found that important supportive mechanisms are equal ownership and creating relationships across administration, professionals, and residents.
- To improve oral care practice in nursing homes it is important to prioritize oral care at the political, organizational and management levels.
- The complexity of older peoples' general and oral health emphasizes the importance of care professionals being given the appropriate knowledge and practical competencies to perform individualized oral care. The situated learning perspective can facilitate individualized oral care and close collaboration between nursing home residents and interdisciplinary health professionals.

## Introduction

Nationally and internationally, more older people enter nursing homes with natural dentition and complex prostheses and bridges than previous generations (McNally, Matthews, Clovis, Brilliant, & Filiaggi, 2014). Healthy aging is compromised by poor oral health as it affects the nutritional state, physical appearance, speech, and quality of life of older people (Christensen, Hede, & Nielsen, 2012; Miegel & Wachtel, 2009). Extensive tooth loss impairs chewing efficiency. Furthermore, tooth loss and dental diseases cause pain and may restrict social contact and inhibit intimacy (Griffin, Jones, Brunson, Griffin, & Bailey, 2012).

Care professionals are facing higher demands on oral care combined with higher complexity in oral care assistance. However, a sufficient standard in oral care becomes more difficult to achieve with higher age, as with many other self-care activities (Lewis, Wallace, Deutsch, & King, 2015). Older people's oral health status may be jeopardized by physical and cognitive impairments, care dependency and limited access to professional oral health care (van der Putten, de Baat, De Visschere, & Schols, 2014). Furthermore, there is a large discrepancy between the number of older people who need help with oral hygiene and the number who receive help (Forsell, Sjögren, & Johansson, 2009; Gaszynska, Szatko, Godala, & Gaszynski, 2014; Petelin, Cotič, Perkič, & Pavlič, 2012; Willumsen, Karlsen, Næss, & Bjørntvedt, 2012). Healthcare staff barriers, knowledge and attitudes

towards oral hygiene and dental health affect how oral care is performed in practice. Collectively, this evidence suggests that oral care should be a high priority in research and practice in the health of older adults. This includes greater attention to oral care strategies from policy and management levels.

## Background

The complexity of older people's dental health and oral hygiene necessitates interdisciplinary and cross-sectoral cooperation. Cross-sectoral programs place great demands on the health system, as prevention efforts should not only focus on a dental clinical perspective but also on the wider preventive work of the health system at a sector, system, and patient-level (Smith & Thomson, 2016). Establishing closer cooperation between dental expertise and health care staff employed in residential care and management support allows for increased attention and better organization of training programs for caregivers to increase the oral hygiene and dental health of older people (Coleman, 2005).

In this article, we explore the implementation of an interdisciplinary and cross-sectoral intervention named the Shared Oral Care Intervention. The intervention is implemented in one of Denmark's larger municipalities. This intervention is inspired by recommendations from the Danish National Board of Health (Sundhedsstyrelsen, 2016) and a development project in Copenhagen Municipality (Hede, Elmelund Poulsen, Christophersen, & Christensen, 2014). Furthermore, the intervention is based on a situated learning perspective (Lave & Wenger, 1991) where nursing home residents, care professionals, and dental practitioners create a working partnership with a focus on increasing nursing home residents' oral hygiene. The intervention included 1) education of care professionals in oral hygiene, 2) assessment of the resident's oral health, 3) rounds with dental care advice based on the resident's oral care routines, oral hygiene status, and the resident's physical and cognitive function level, and 4) design of an individual oral care plan.

Overall, the intervention project was adapted from the United Kingdom Medical Research Council's guidance on the development and evaluation of complex interventions (Craig, Dieppe, Macintyre, Health, et al., 2008). The effect of the Shared Oral Care intervention is tested in a cluster randomized controlled trial and reported elsewhere. Hoben et al. (2017) have however highlighted the need for more rigorous research on barriers and facilitators, informed by process evaluation when providing oral care to nursing home residents. Process evaluation of complex interventions can generate useful knowledge for interdisciplinary health care professionals, managers and policymakers to design future health interventions across sectors and professions, as underlined by the Medical Research Council (Craig, Dieppe, Macintyre, Michie, et al., 2008).

## Theoretical evaluation approach

The process evaluation draws on the principles of realist evaluation (Pawson & Tilley, 1997), as this approach provides an understanding of the complexity within nursing practice and oral health care. The Shared Oral Care intervention can be characterized as a complex intervention in terms of how it interacts with different nursing home contexts via attempts to change pre-existing oral care practices and nursing home managers' and care professionals' cooperation with the dental department. The complexity is also present in the challenging behaviors of cognitively impaired residents. The number of organizational levels targeted also adds to the complexity (Craig, Dieppe, Macintyre, Health, et al., 2008). The purpose of a realist process evaluation is to understand, rather than test for, the effects of the intervention (Grant, Treweek, Dreischulte, Foy, & Guthrie, 2013) and to understand how the intervention, in this case the Shared Oral Care intervention, works, for whom, and under what circumstances (Pawson & Tilley, 2004).

The situated learning perspective was the key conceptual framework for the Shared Oral Care intervention. According to the perspective of situated learning (Lave & Wenger, 1991), learning is linked to participation in social practice communities. Learning about oral care takes place in a practice context at each nursing home and is related to the process where the care professionals and nursing home residents, depending on the residents' cognitive and physical impairments, move from legitimate peripheral participation to full participation in the social community (Lave & Wenger, 1991). This means that the focus is on the practical execution of the oral hygiene tasks related to the individual resident, as opposed to a focus on knowledge dissemination in a lecture or class teaching. Thus, the care professionals attain recognition of the task, its meaning, and importance, but they also acquire the actual manual skills by performing the task (Hede et al., 2014).

## Methods

### Design

The study is designed as an embedded multiple-case study (Yin, 2014) in combination with principles of realist evaluation. It is an adjunct study to a cluster randomized controlled trial, where each included nursing home represents a case. This study adhered to the Consolidated criteria for reporting qualitative research (Tong, Sainsbury, & Craig, 2007)(COREQ, Supplementary File 1).

For this process evaluation, only nursing homes from the cluster randomized trial that had received the intervention were considered eligible cases. Three cases were selected using the logic of literal replication due to the expectation of a similar outcome (Yin, 2014). The three nursing homes differed in size but all housed physically and cognitively impaired older adults and had a smaller

section for residents living with dementia. Each of the three cases holds several embedded units of analysis, which are nursing home residents, care professionals, nursing home managers, dental practitioners, a dentist, and a dentist manager, all taking part in the Shared Oral Care intervention.

The evaluation unfolded in three phases inspired by the realist evaluation circle (Pawson & Tilley, 1997): Phase 1) formulation of an initial program theory presented in a logic model, Phase 2) testing the program theory by collecting and analyzing data, and Phase 3) refining the program theory focusing on what works for whom, under what circumstances (Funnel & Rogers, 2011).

#### Phase 1

A program theory of the intervention was developed during the development and feasibility/pilot stage following the guidance from The Medical Research Council (Craig et al., 2008). This theory presents the resources, activities and expected outcomes (Moore, Audrey, Barker, & Bond, 2014). These outcomes were derived from a review of the literature primarily from western countries with oral health care issues comparable to Denmark, and the development of the intervention and practical experience of implementing a similar intervention in Copenhagen municipality (Hede et al., 2014). The modeling of the intervention to Aalborg municipality included the transformation of the Shared Oral Care intervention from a development project into a research project and discussions with the project steering committee.

#### Phase 2

The program theory was tested using several different data collection methods and analysis of the data.

##### *Data Collection*

To uncover the contextual factors and mechanisms underpinning the performance of situated learning, we drew upon a number of methods including observations with situated interviews, face-to-face interviews and group interviews.

The observations took place during the dental practitioner's implementation of the Shared Oral Care intervention. The researcher (KA) followed each dental practitioner four times. The observation guide focused on the context of each case and mechanisms during the implementation of the Shared Oral Care intervention. The inspiration for the observation guide was a concept analysis of context and implementation (Pfadenhauer et al., 2015) and The Context and Implementation of Complex Interventions (CICI) tool (Pfadenhauer et al., 2017).

A purposive and convenience sample of participants who were involved in or had an influence on the Shared Oral Care intervention were included in the process evaluation: 1) nursing home

residents with and without cognitive impairments and different degrees of physical impairments; 2) care professionals participating in the Shared Oral Care intervention; 3) assistant nursing home managers involved in planning and structuring the intervention with the project dentist; 4) three dental practitioners; and 5) the project dentist, who is responsible for the logistical planning of the intervention and cooperation with the nursing homes. In total six group interviews and 22 face-to-face interviews with dentists, dental practitioners, nursing home managers, care professionals, and residents were conducted (n = 41).

The interview guide for the group and face-to-face interviews for nursing and dental staff, and residents was developed based on four process evaluation domains: mechanisms of change, acceptability, barriers and facilitators, and sustainability. The interviews were conducted at the participants' place of work, audio-recorded and transcribed verbatim. The interviews lasted from 30 to 104 minutes.

The situated interview guide was developed based on four concrete questions about the acceptability of the Shared Oral Care intervention and the importance of having clean teeth. The interview guide was pilot tested and adjusted so that cognitively impaired residents would have a better opportunity to answer the questions or some of the questions. The same researcher (KA) conducted each observation and interview to ensure consistency. Both observations and interviews were held during the six-month intervention period. The interviews were conducted during the researcher's fourth observation of the dental practitioner and questions were asked about the oral care situation to get a spontaneous answer from the nursing home residents. Written notes from residents' answers were taken immediately after each interview.

#### *Analyses*

Initially, the data from each nursing home and dental department (cases) were open coded in terms of statements related to contexts, mechanisms, and outcomes. Context is defined as *"how external factors influence the delivery and functioning of interventions"*, mechanisms are *"how intervention activities, and participants' interactions with them, trigger change"* (Moore et al., 2014, p. 10) and outcome is the observed interaction between contexts and mechanisms (Astbury & Leeuw, 2010).

Using data from both observations, face-to-face interviews, and group interviews, we produced a table for each nursing home and the dental department and listed in columns the identified key contexts, mechanisms, and outcomes. Data were managed in NVivo 12.

The analysis continued using thematic analysis (Braun & Clarke, 2006), using context, mechanism, and outcome together as an imaging tool. Open codes were merged to form more general codes and

grouped under overarching themes. The themes were further sorted into themes related to an individual level, an interpersonal level, and an organizational level of each case. Themes sorted under Mechanisms were further divided into supportive and restraining mechanisms. The next step was a cross-case analysis of the Context-Mechanism-Outcome configurations from the three nursing homes and the dental department. The Context-Mechanism-Outcome configurations were compared at the individual level, interpersonal level and the organizational level and further condensed. Each theme was reviewed and refined across cases and a thematic map of the analysis was generated.

### Phase 3

Based on the final analysis, the program was specified with a focus on what works, for whom, under what circumstances. This knowledge can lead to the improvement of the existing program theory developed in phase 1.

### Ethics

The study data were collected in Denmark and the project thus conducted according to the Danish Code of Conduct for Research Integrity. The research project is reported to the Danish Data Agency. The National Scientific Ethics Committee has furthermore confirmed in writing that according to §14, section 2, this research project does not need approval from the committee. The study is based on informed oral and written consent from all participants (ICMJE, 2020). There are challenges to researching with nursing home residents. Frail older people may have difficulties taking informed consent (Kirkevold & Bergland, 2007) and providing detailed accounts of their experiences (Hall, Longhurst, & Higginson, 2009). The specific challenges were taken into account when planning the data collection. Informed consent was taken with help from close relatives in the form of a deputized informed consent when the resident was cognitively impaired. This assessment was performed in dialogue with the care professional, who knew the resident well. Questions were carefully phrased, keeping the vulnerable resident's integrity and autonomy in mind. If the residents had memory deficits, questions that exposed these problems were avoided (Kirkevold & Bergland, 2007). During the development and pilot stage, it was decided to do very short interviews with the residents in continuation of the Scared Oral Care intervention. This was a way to support the residents' memory of the new oral care routines. During each encounter with the residents, the dental practitioner presented herself and repeated the purpose of her visit and actions. The ethical guidelines for nursing research in Scandinavia was fulfilled (Sygepleiernes Samarbeid i Norden & [Northern Nurses' Federation], 2003)

## Results

Based on the realist evaluation approach, we described the context at each socio-ecological level and identified the supportive and restraining mechanisms in these contexts alongside outcomes related to each level. The initial program theory, including contexts, mechanisms, and outcomes for each of these levels, is presented below. Quotes from interviews are presented in italics.

### Phase 1: Development of a logic model

The initial program theory is presented as a pipeline logic model (Funnel & Rogers, 2011) with four columns. A logic model is a diagrammatic representation (Moore et al., 2014) of the Shared Oral Care intervention. In the first column, the resources of the intervention are presented, including personal resources, planning and coordinating and intervention participants. The second column includes activities, means, and instruments. The third column presents the expected mechanisms and contextual factors. Mechanisms are defined as the processes through which an intervention will work' (Moore et al., 2014). The fourth column presents the expected proximal outcome and distal outcome (figure 1), which are the intended short term and long term outcomes of the intervention (Moore et al., 2014).

***Please insert figure 1: The initial program theory around here***

### Phase 2: Testing the program theory

There were three main themes identified, which are presented as outcomes in the program theory (figure 2). Each outcome theme is related to either a resident level: *New oral care routines*, an interdisciplinary level: *Professional pride and dilemmas in performing sufficient oral care*, or an organizational level: *Increased interdisciplinary knowledge sharing*. Each level represents a specific facet of the program theory.

***Please insert figure 2: The program theory's main themes around here***



Resident level

#### *New oral care routines*

All included residents gained new tooth brushing habits during the intervention period. Some residents were able to change their daily habits themselves after gaining new knowledge and support from the dental practitioner and care professionals. One resident changed tooth brushing habits from once a week after the weekly bath to every morning (Observation nursing home 2). Other residents reported new focus points related to the practical execution of tooth brushing (Resident interview B5, B6). The right tooth brushing equipment was also a way to support new habits. An extra-soft toothbrush had resulted in a resident agreeing in receiving support in tooth brushing more often (Observation nursing home 2). Thus, new tooth brushing habits were supported by knowledge, practical support, respect of the residents' care routines and tooth brushing equipment.

#### Context

Supporting and providing oral care was a complex task to perform in nursing homes. Cognitive impairment could result in care professionals having difficulty supporting or helping residents with oral hygiene. *"Sometimes I may be allowed to help brush the teeth, but that is only if I spent 5-10 minutes having a little conversation"* (Group interviews nursing home 3a). Many residents were physically impaired, which would challenge these residents' ability to brush their teeth sufficiently (Observation nursing home 2, 3, 4). When citizens moved to nursing homes they brought with them tooth brushing habits developed over a lifetime. These habits could be very difficult to change.

#### Supportive mechanisms

Trust between the residents and the care professionals and dental practitioners was a recurring supportive mechanism. *"Then it is time for tooth brushing, with some (residents) you joke a little, others with dementia you minimize the physical contact by placing you behind the resident and then you brush"* (Group interview nursing home 3a). The care professionals used their knowledge of residents' daily routines and response patterns during oral care and close personal contact. For some cognitively impaired residents, the way the care professionals placed themselves in the room when supporting the oral hygiene procedure was of great importance to create trust and succeed with oral care routine. Dental practitioners visited the residents in their uniforms and were often presented by the care professionals as the dentist. This specific trust in authority often made cooperation between resident and dental practitioner easier (Observation nursing home 2, 3, 4). When asked about their experiences with oral hygiene checks at short intervals, this participant reflected others'

views in saying: *"I am happy with the visit. It may take some time getting used to being looked in the mouth"* (Resident interview B10).

All participants had an individual oral care plan that was based on the resident's cognitive and physical functional level and adapted to residents' daily routines and personal ways of brushing teeth. The residents were encouraged to brush their teeth as usual and then the dental practitioner gave feedback and showed where the routines could be improved (Observation nursing home 2, 3, 4). Over time, the care professionals became more aware of supporting residents in performing daily oral care by verbal guidance or physically performing oral care for the resident (Observation nursing home 2, 3, 4).

#### Restraining mechanisms

Everyday oral care routines were affected by the resident's emotional state and level of cognitive impairment. This placed special demands on the staff. Cognitively impaired residents exhibited aversive behavior such as turning their heads and closing their mouths during the oral care procedure (Observation nursing home 3). Related to the aversive behavior was often a verbal expression of a lack of understanding for the increased oral care focus. A cognitively impaired resident said *"not again"* when asked by the dental practitioner to join her in the bathroom for a tooth brushing but still followed the dental practitioner to the bathroom (Observation nursing home 4).

For residents in all three case sites, everyday routines and activity services were prioritized over oral care. During the intervention period, observations showed that it was important for the dental practitioner to take individual considerations for each resident's circadian rhythm, training activities, social arrangements and care professionals' time to support the residents in oral care (Observation nursing home 2, 3, 4).

#### Interpersonal level

##### *Professional pride and dilemmas in performing sufficient oral care*

Overall, the collaboration between the care professionals and the dental practitioner was smooth. However, when the dental practitioner had to convey that a resident's oral hygiene was insufficient, the professional pride of the care professionals was often hurt. The included nursing manager said, *"If the dental practitioner only knew just how much trouble the care professionals had trying to brush the resident's teeth"* (assistant nursing home manager 3).

During the situated learning moments, the care professionals were keen to find out if the residents' teeth were sufficiently cleaned, and some expressed annoyance if told that the resident for instance

still had signs of gingivitis (observation nursing home 3). Furthermore, professional pride could be injured on behalf of a colleague: *"It is super embarrassing to be told by the dental practitioner that my colleagues in the night shift haven't brushed the residents' teeth before helping them to bed"* (Group interview nursing home 3a).

Thus, the care professionals experienced a dilemma between professional pride, challenges of collaborating with residents, having sufficient skills to perform oral care and colleagues' different prioritization of supporting residents in performing oral care.

#### Context

Everyday oral care practice was characterized by the bustle of many practical tasks. A few care professionals sought out knowledge by the dental practitioner; others thought it was difficult to prioritize oral care due to restricted time and illness among staff (Observation nursing home 2).

Data from the clinical assessments of oral hygiene showed that hygiene levels differed between the three nursing homes and care professionals gave different priorities to oral care. Often provision of oral care was not the first priority in assisting residents with personal hygiene, as explained by one of the care assistants: *"The mouth is just a small part of the whole human being, so the mouth is just not the first on our list. Many times, you have to choose between the most basic care and the choice is on a clean pair of trousers and a clean diaper"* (Group interview nursing home 4b).

Neither was oral health of consequence in the physical assessment if a resident's health status changed: *"the oral hygiene status is neither the first nor the second choice when we are searching for an explanation"* (Group interview nursing home 4b).

#### Supportive mechanisms

Building a relationship with residents and care professionals was of great importance for dental practitioners for the intervention to be successful. Good relationships made the residents feel safe during the oral care procedure. An acknowledging feedback style when instructing residents and care professionals in different oral care procedures was also important. Overall, the care professionals appreciated knowledge sharing in specific situations with residents: *"they (dental practitioners) come with their professionalism and say, well, if you do so and so, then it will be much better.... It is nice to know, if it is the right thing you do"* (Group interview nursing home 4b).

Furthermore, the dental practitioner balanced between being flexible and adhering to the schedule during the intervention visits to the nursing homes. Before the visits, a schedule was sent to nursing home managers and care professionals. It was important to keep the schedule during the visits and thus not create unnecessary disturbances in care professionals' daily practices. At the same time, it

was necessary to be flexible due to important care routines or the residents' state of mind (Observation nursing home 2, 3, 4).

#### Restraining mechanisms

If the care professionals felt that the dental practitioner only focused on oral hygiene and not on the participant as the whole human being, this difference in perspective could be a restraining mechanism that created misunderstandings. Embedded in this was the care professionals' wish to be acknowledged for their everyday work with the residents and the challenges they often faced when trying to perform sufficient oral care on a resident not able to cooperate. *"We would like for them (dental practitioners) to understand that we not only have a mouth to care for, but we must take care of everything about the individual resident"* (Group interview Nursing home 3b). To overcome this potential and important mechanism, the dental care practitioners prioritized observation of all participants and tried to adjust their oral care advice to each resident's daily routines (Observation nursing home 3).

#### Organizational level

##### *Increased interdisciplinary knowledge sharing*

Increased interdisciplinary knowledge sharing between dental practitioner, care professional and resident was closely related to both the way the dental practitioners practiced situated learning and the way management took the responsibility of the care professionals' professional development. *"It's really a matter of handing over the toothbrush, practically speaking, to the care professionals, so that we observe and give practical support and guidance to the care professional standing next to us"* ( Interview dentist 1).

Increased interdisciplinary knowledge sharing happened when the structure to support knowledge sharing was created, the manager took responsibility in implementing Shared Oral Care, and the manager also created time for learning (Observation nursing home 4). As phrased by the management representative: *"It is my responsibility to strengthen their (the care professionals) caring professionalism.... and ability to think outside the box when assessing residents habitual state"* (Interview assisting nursing home manager 4).

#### Context

Observations revealed that the three nursing homes had different management priorities and took different responsibilities in the planning of the care professionals' participation in the intervention. Some managers involved in the project mainly prioritized the daily operation of the nursing home and securing the care professionals' work schedules without including the implementation of the Shared Oral Care intervention (observation nursing home 2, 3). One nursing home manager, on the

other hand, engaged strongly in the project and took the responsibility of informing the care professionals, coordinating daily practice and the implementation of the intervention (Observation nursing home 4). This behavior repeated itself concerning the placement of responsibility for care. Two managers would place the responsibility of care with the care professionals (observation nursing home 2, 3) while the third manager would in a very conscious way support the care professionals in their decision-making and reflections on the challenges and strategies of care (Observation nursing home 4).

#### Supportive mechanisms

Knowledge sharing was observed at several professional levels. A supportive mechanism was when nursing home management took responsibility for the structure and planning of the intervention. One nursing home accepted the offer of one hour of teaching by the project dentist and systematically organized for the whole staff in the day and night shift to be able to participate. *"We have the opportunity in our working schedule to plan and secure that all our staff receives the teaching session about the project and oral hygiene"* (Interview assistant nursing home manager 4). Furthermore, nursing home management attitude towards the implementation of the intervention appeared to have a positive effect. *"It is about what you decide as management. We were positive, we both thought it was very relevant, therefore I just think we decided to go all-in"* (Interview assistant nursing home manager 4).

#### Restraining mechanisms

In one of the three included nursing homes, a dental practitioner was challenged by resistance from the care professionals due to a lack of information from the management. Sometimes, the care professionals almost hid when the dental practitioners came to visit, as one of the explained in a group interview: *"A few of them (care professionals) fled and then they passed the student off to me 'because she has to learn and I (care professional) have something else to do'"* (Group interview 1 c). This restraining behavior was observed in the nursing homes where the management did not take ownership or responsibility for intervention.

In other cases, a lack of support in knowledge sharing appeared as a restraining mechanism. During the interviews, all three managers were asked about their considerations regarding knowledge sharing among care professionals during the project period. Two of the three managers were not involved in knowledge sharing and no special assistance was launched. As an explanation, one of them said: *"I expect knowledge sharing among the staff, and also between day and evening shifts. I don't expect them to forget what they have learned"* (interview assistant nursing home manager 2).

### Phase 3 – Program specification

In phase 3 of the process evaluation, the specified program theory of the intervention program is presented. This is done by discovering what works for whom in a given set of circumstances (Pawson & Tilley, 1997). The initial program theory represented in figure 1 and figure 2 of the program specification differ in the way the two figures are presented. During the test of the initial program theory, it became useful to divide the analysis and the presentation of the program specification into three socio-ecological levels: a resident level, an interpersonal level, and an organizational level, as different implementation strategies and challenges were related to a specific level. The most important program specifications are emphasized below.

#### What works

Creating a trusting resident, care professional and dental practitioner relationship was an important mechanism across the socio-ecological levels. This relationship was essential for the resident and care professional to prioritize and change oral care routines. Relationships and mutual understanding at the organizational level were also key to create ownership and responsibility for the intervention. The way the Shared Oral Care intervention was approached at this level had an important and supporting effect on the relationships at the resident and interpersonal level.

Lack of ownership and responsibility for the intervention was regarded as the most influential restraining mechanism affecting all three levels in the program theory. The balance between dental and care-related professionalism and organizational considerations was central to the implementation of the Shared Oral Care intervention as the professionals were located in two different administrations in the municipality. In the present study, it would have been important to more deliberately intervene at the organizational level, including both nursing home management and the two different administrations in the municipality. This could have strengthened the implementation process in all the nursing homes.

#### For Whom

The target groups of the Shared Oral Care intervention included primarily residents with physical and cognitive impairments and care professionals. It seems that it is possible to implement the Shared Oral Care intervention with most nursing home residents, including those who are physically and cognitively impaired. This is because the intervention assessment included four steps: 1) education of care professionals in oral hygiene, 2) assessment of the resident's oral health, 3) rounds with dental care advice based on the resident's oral care routines, oral hygiene status, and the resident's physical and cognitive function level, 4) design of an individual oral care plan. The four steps of the

intervention combined with the care professionals' knowledge of the residents' everyday life at the nursing home made an individual adjustment of the intervention possible.

Under what circumstances

The resident's pre-existing oral care routines and cognitive impairments appeared to be important factors. The care professionals' ability to notice oral care problems and the different ways the nursing home managers took responsibility for the care delivered in the nursing homes were contextual factors, which had a great influence on the implementation of the Share Oral Care intervention.

The interdisciplinary working relationship between care professionals and dental practitioners, with the active involvement of residents, was more likely to come into existence when nursing home managers took responsibility for the structure and planning of knowledge sharing and implementation of new oral care routines. Related to this was another important contextual factor, which was how care professionals and nursing home managers navigated task and timely service delivery, staff shortages and securing sufficient oral health care in residents. The consequences of a task and time approach could be that it was acceptable to prioritize what was visible for the eye, and that was a clean diaper and a clean pair of trousers, at the expense of oral hygiene. At the top organizational level in the municipality, there was no common dialogue about mutual expectations, cooperation and project support between the two administrations representing the dental and care-related perspectives respectively. This also had a great influence on the Shared Oral Care intervention's implementation process.

## Discussion

This study was designed to evaluate 'what works, for whom, under what circumstances' when implementing the Shared Oral Care intervention at selected nursing homes in Aalborg Municipality. We used a realist evaluation approach to present a program theory containing a resident, an interpersonal, and a contextual level of the Shared Oral Care intervention.

With oral health care practice playing an important role in nursing home residents' general health and quality of life, this study identified some important dimensions of the Shared Oral Care intervention that can contribute to better, more consistent oral care and better cooperation between residents, care professionals, and dental practitioners. The Shared Oral Care intervention appears to support the implementation of new oral care routines in nursing home residents.

Furthermore, care professionals' professional pride in oral care is strengthened and has contributed to better interdisciplinary knowledge sharing. Thus, this study adds to the small body of research on

tailored oral care interventions and the crucial barriers and facilitators that affect a successful intervention.

The complexity in older peoples' general and oral health profiles is related to their physical impairment including the loss of ability to perform oral self-care. This physical impairment is a common complication secondary to cognitive impairment of older people (Chen et al., 2015).

Research on older people with different levels of cognitive impairment shows that oral hygiene and the presence of caries are worse with greater cognitive impairment (Chen et al., 2015; Gil-Montoya et al., 2017). This complexity in older people's general and oral health emphasizes the importance of care professionals being given the appropriate knowledge and practical competencies, as reflected in supportive mechanisms evidenced in this process evaluation

Improving oral health care in nursing homes is a long-lasting investment and may involve a real paradigm shift (van der Putten et al., 2013). This paradigm shift must include all three of the levels discussed in this study and a structural level to succeed. The levels of context and mechanisms interact and affect the outcomes in various crosswise ways. The two administrations in the municipality, the three nursing homes and even departments in the nursing homes had different cultures and levels of contextual readiness regarding dental care and participating in the Shared Oral Care intervention. The imbalance between the two administrations in the municipality and lack of ownership in nursing home managers at the organizational level were both significant restraining mechanisms that affected outcomes at all levels in the presented program theory. These can be related to the dilemma between exploration and exploitation, "the ambidexterity dilemma" (Brix, 2019). To succeed in change all stakeholders need to negotiate ownership of the specific change, here related to the Shared Oral Care intervention. Furthermore, conditions for capacity building at the organizational and individual level should be present. This means that stakeholders at the organizational level should create structures and processes that support the improvement of the care professionals' and dental practitioners' work. At the individual level, there is a need for assisting the enhancement of the care professionals' existing capabilities (Brix, 2019). Thus, the circumstances under which the intervention is performed constitute an important consideration when planning and implementing an intervention. In nursing homes where there was a lack of ownership and structured leadership, the restraining mechanisms tended to overrule the supportive mechanisms. This may be interpreted as reflecting suboptimal organization of the intervention.

At the interpersonal level, it was clear that the success of the intervention also was dependent on the care professionals' knowledge and personal attitude towards the project and focus on oral care. This finding is supported by the literature, which reports a general reluctance of care professionals



to prioritize oral care due to limited knowledge and psychological barriers (Mohammadi, Franks, & Hines, 2015). Furthermore, in the Danish primary health care system, many nursing assignments are delegated to care helpers and care assistants both in nursing homes and in the older persons' private homes. This group of care helpers and care assistants has heterogeneous preparation and professional skills (Vinge, 2018). This situation is the same in other Western countries (Hoben et al., 2017). Therefore, the situated learning perspective is promising, as it is possible to individually adjust needed knowledge and practical competencies to each care professional and resident.

The situated learning perspective also opens up the possibility of creating important relationships across sectors and professions, and between residents and professionals. In these relationships, trust is an important concept. In the Shared Oral Care intervention building relationships and creating the trust was an important and ongoing part of the dental practitioners' way of guiding and teaching residents and care professionals new oral care routines. Developing a positive and trusting relationship is the basis for delivering fundamental and person-centered care when dental practitioners and care professionals are implementing new oral care routines with residents (Feo, Rasmussen, Wiechula, Conroy, & Kitson, 2017). Trusting relational conditions are essential for the individual dental practitioner and care professional, and the organizations and administrations as a whole to reach their goals (Krogstrup, 2017), in this intervention to increase nursing home residents' oral hygiene. However, a study limitation to these relational conditions was the lack of relation capacity building at the organizational and administrative level.

### Strengths and limitations

Employing realist evaluation in this complex intervention study offered a valuable perspective on how to understand the complexity of developing and implementing new health care practices. It is a way of taking into account factors relevant to intervention effectiveness and at the same time including these factors in the analysis (Pawson & Tilley, 2004). We found that relating the Context-Mechanism-Outcome configurations to different socio-ecological levels in the program theory made it possible to emphasize the different contextual conditions and mechanisms operating at different levels.

Implementation occurred according to the initial program theory, which means that the theory accurately describes what happens during implementation (Funnel & Rogers, 2011). However, the outcomes emerged with varying strengths in the three nursing homes, depending on the structure and how the nursing home management takes part in the responsibility of implementing the intervention. This could indicate that the implementation of the activities presented in the initial program theory requires refinement.

## Relevance for clinical practice

To strengthen and improve oral care in nursing home residents through health policy, we recommend a cross-sectoral and an interdisciplinary approach to secure knowledge sharing, joint implementation strategies and professional development of oral care in nursing home residents. This is likely to have important distal effects on population health status in nursing home residents.

The situated learning perspective applied in this intervention was found adaptable to a public nursing home context and useful for the facilitation of individualized oral care and close interdisciplinary collaboration. The Shared Oral Care intervention supports an individual and multidisciplinary assessment of nursing home residents' ability to self-care concerning oral care. This approach could therefore also be considered in other preventive interventions or care improvement projects in nursing homes. Furthermore, the situated learning perspective is a way to support care professionals' capacity building in practical skills related to oral care and thereby strengthen professional pride.

## Conclusion

This process evaluation explored the process of implementing an oral care intervention in different nursing home contexts and addressed the questions of: *'what worked in the oral care intervention, for whom and under what circumstances?'* We found that the situated learning perspective applied in the intervention facilitated trusting relationships and knowledge translation between residents and professional groups and thus supported the nursing staff to develop competencies in performing sufficient oral care. Tailoring the Shared Oral Care intervention to the specific needs of the nursing homes and the municipality's organizational structure is crucial. The important supportive mechanisms are equal ownership, creating structures and processes that support knowledge sharing and creating relationships across the municipality administrations, across professions and involvement of the residents.

Lack of contextual readiness was particularly salient in two of the nursing homes alongside a multitude of restraining mechanisms. Adjustment of the Shared Oral Care intervention to an increased focus on building relationships and creating ownership specifically in nursing home organizations and the two administrations in the municipality was essential to the success of the intervention.

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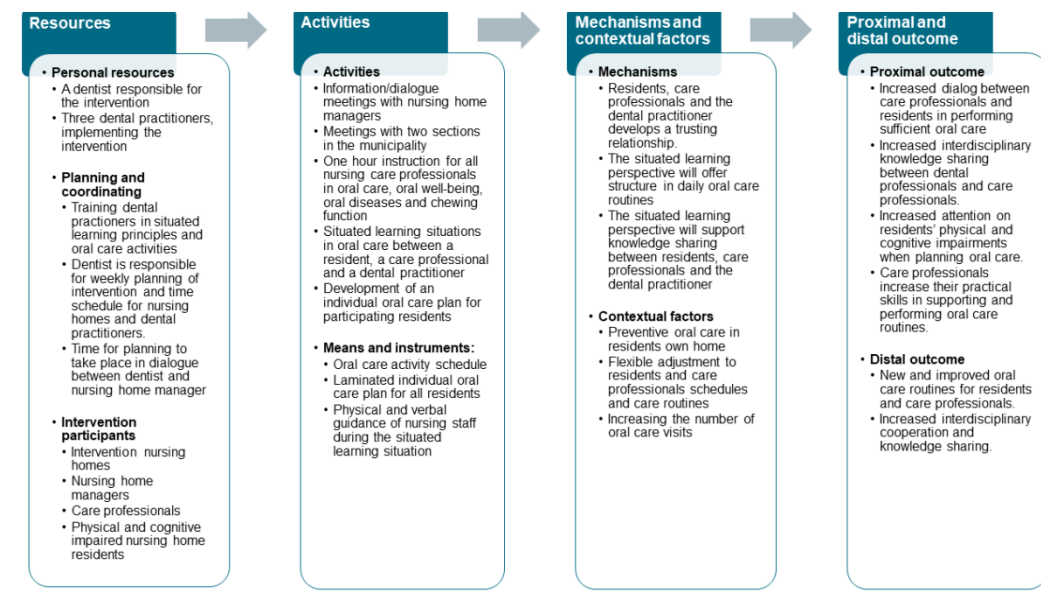
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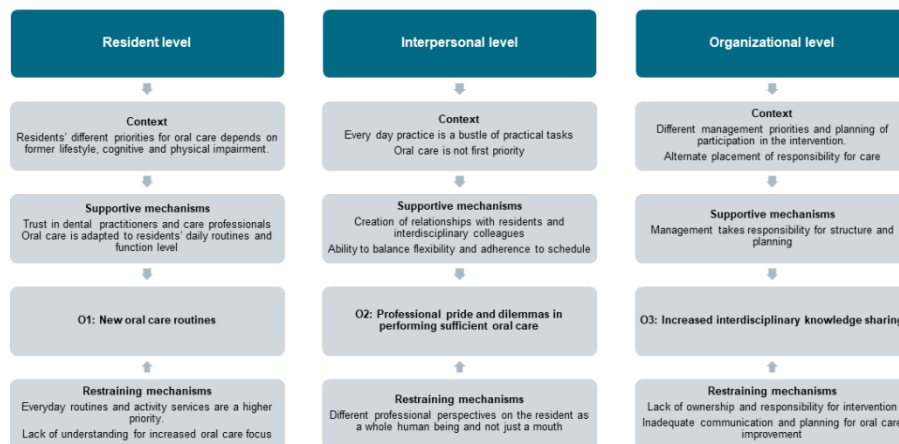
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